

AMENDMENTS TO THE CLAIMS

For the convenience of the Examiner, all claims have been presented whether or not an amendment has been made.

1. (Currently Amended) An audio conference server ~~(ACS) for enabling an application program to provide multi-point, weight-controllable audio conferencing,~~ the ACS comprising:

managing means operable to manage ~~means for managing~~ at least one audio conference, ~~said at least one audio conference including~~ among a plurality of audio clients;

receiving means operable to receive ~~means for receiving~~ audio data from ~~said~~ the plurality of audio clients;

mixing means operable to mix the audio data into spatialized audio data; and
~~means for mixing said audio data to provide spatialized audio to said plurality of audio clients in said at least one audio conference wherein said mixing means includes means for providing distance-based attenuation according to sound decay characteristics, at least one sound decay characteristic being assigned to each audio client from a plurality of different sound decay characteristics, each different sound decay characteristic providing a different volume/distance relationship, wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and wherein said mixing means results in mixed audio data; and~~

delivery means operable to deliver the spatialized audio data to the plurality of audio clients; ~~means for delivering said mixed audio data to said plurality of audio clients in said at least one audio conference.~~

wherein the mixing means includes attenuation means operable to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, each sound decay characteristic being associated with a respective audio client and a respective volume/distance relationship.

2. (Canceled)

3. (Currently Amended) The audio conference server ACS of claim 1, further comprising checking means operable to check a ~~means for checking the~~ status of a registered owner of ~~said the~~ at least one audio conference to determine whether ~~said the~~ at least one audio conference still exists.

4. (Currently Amended) The audio conference server ACS of claim 3, wherein ~~said the~~ checking means includes a resource audit service, ~~said the~~ resource audit service operable when ~~said the~~ at least one audio conference is generated by a first application and is being used by a second application.

5. (Currently Amended) The audio conference server ACS of claim 1, wherein ~~said the~~ plurality of audio clients includes set-top box (~~STB~~) audio clients and point source audio (~~PSA~~) ~~audio~~ clients.

6. (Currently Amended) The audio conference server ACS of claim 1, wherein ~~said the~~ managing means comprises an audio conference server shell operable ACS shell to allow a user to interactively interface with ~~said ACS, said ACS the audio conference server, the audio conference server~~ shell including:

means for providing program access to high level methods for creating and managing a proxy audio conference;

means for providing program access to methods for creating and managing a plurality of ~~PSA~~ point source audio clients; and

means for providing program access to low level methods for creating and managing ~~said~~ at least one audio conference.

7. (Currently Amended) An audio conference server (ACS) ~~for enabling an application program to provide multi point, weight controllable audio conferencing, the ACS comprising:~~

managing means operable to manage ~~means for managing~~ at least one audio conference; ~~said at least one audio conference comprising~~ among a plurality of audio clients;

receiving means operable to receive ~~means for receiving~~ audio data from said the plurality of audio clients;

~~means for mixing said audio data to provide spatialized audio to said plurality of audio clients in said at least one audio conference,~~

~~wherein said mixing means includes means for providing distance based attenuation according to sound decay characteristics,~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixing means results in mixed audio data; and~~

~~means for delivering said mixed audio data to said plurality of audio clients in said at least one audio conference;~~

~~wherein said means for providing distance based attenuation according to sound decay characteristics comprises:~~

mixing means operable to mix the audio data into spatialized audio data; and

delivery means operable to deliver the spatialized audio data to the plurality of audio clients;

wherein the mixing means includes attenuation means operable to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, the attenuation means comprising:

means for identifying a decay factor from one of a plurality of pre-defined decay factors and a customized decay factor for each of ~~said~~ the plurality of audio clients, ~~said the~~ plurality of pre-defined decay factors including an audio big decay factor, an audio small decay factor, an audio medium decay factor, and a constant decay factor;

means for determining distances between a target audio client and a

plurality of source audio clients;

means for determining a plurality of weighted values for each of ~~said~~ the source audio clients based on ~~said~~ the identified decay factor and ~~said~~ the distance between each of ~~said~~ the source audio clients and ~~said~~ the target audio client, wherein each of ~~said~~ the weighted values corresponds to a source/target audio client pair;

means for generating a mix table for each of ~~said~~ the source/target audio client pairs;

means for calculating an actual mix for ~~said~~ the target audio clients;
and

means for refining ~~said~~ the actual mix for ~~said~~ the target audio clients.

8. (Currently Amended) The audio conference server (~~ACS~~) of claim 7, wherein ~~said~~ the refining means comprises:

a gain control function operable to avoid transmitting excess energy audio data;

a fade in/fade out function operable to avoid the delivery of ~~said~~ the audio data in a step-wise manner to a speaker output;

a floating point operation elimination function operable to avoid the performance of floating point multiplication;

a mixing adaption function operable to adapt the actual mix calculation for ~~said~~ the target audio client to available CPU resources;

a mixing cut-off function operable to select the nearest talking audio clients for the actual mix; and

a stream audio function operable to prepare stream audio for playing ambient background music or using an audio source forwarded from another conference.

9. (Currently Amended) A method for enabling an audio conference server ACS to provide an application program with multi-point, weight controllable audio conferencing, comprising:

(1) managing at least one audio conference, ~~said at least one audio conference comprising among~~ a plurality of audio clients;

(2) receiving audio data from ~~said the~~ plurality of audio clients;

(3) mixing ~~said the~~ audio data to yield spatialized audio data; and ~~provide spatialized audio to said plurality of audio clients in said at least one audio conference,~~

delivering the spatialized audio data to the plurality of audio clients;

wherein mixing the audio data to yield spatialized audio data comprises providing distance-based attenuation according to a plurality of predetermined sound decay characteristics, each sound decay characteristic being associated with a respective audio client and a respective volume/distance relationship.

~~wherein said mixing means includes providing distance based attenuation according to sound decay characteristics, at least one sound decay characteristic being assigned to each audio client from a plurality of different sound decay characteristics, each different sound decay characteristic providing a different volume/distance relationship,~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixing results in mixed audio data; and~~

(4) ~~delivering said mixed audio data to said plurality of audio clients in said at least one audio conference.~~

10. (Canceled)

11. (Currently Amended) The method of claim 9, further comprising checking ~~the~~ a status of a registered owner of ~~said the~~ at least one audio conference to determine whether ~~said the~~ at least one audio conference still exists.

12. (Currently Amended) The method of claim 11, wherein ~~said~~ checking ~~includes~~ comprises activating a resource audit service, ~~said resource audit service operable~~—when ~~said~~ the at least one audio conference is generated by a first application and is being used by a second application.

13. (Currently Amended) The method of claim 9, wherein ~~said~~ the plurality of audio clients includes set-top box (~~STB~~) audio clients and point source audio (~~PSA~~) ~~audio~~ clients.

14. (Currently Amended) The method of claim 9, wherein ~~said~~ managing the at least one audio conference comprises providing program access to high level methods for creating and managing a proxy audio conference using an audio conference server ~~ACS~~ shell.

15. (Currently Amended) The method of claim 9, wherein ~~said~~ managing the at least one audio conference comprises providing program access to methods for creating and managing ~~said~~ the point source audio using an audio conference server ~~ACS~~ shell.

16. (Currently Amended) The method of claim 9, wherein ~~said~~ managing the at least one audio conference comprises providing program access to low level methods for creating and managing ~~said~~ the at least one audio conference using an audio conference server ~~ACS~~ shell.

17. (Currently Amended) A method for enabling an audio conference server (ACS) to provide an application program with multi-point, weight controllable audio conferencing, comprising:

(1) managing at least one audio conference, ~~said at least one audio conference comprising among~~ a plurality of audio clients;

(2) receiving audio data from ~~said the~~ plurality of audio clients;

~~(3) mixing said audio data to provide specialized audio to said plurality of audio clients in said at least one audio conference;~~

~~wherein said mixing includes providing distance-based attenuation according to sound decay characteristics;~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixing means results in mixed audio data;~~

(4) delivering ~~said mixed audio data to said plurality of audio clients in said at least one audio conference;~~

mixing the audio data to yield spatialized audio data; and

delivering the spatialized audio data to the plurality of audio clients;

wherein mixing the audio data to yield spatialized audio data comprises providing distance-based attenuation according to a plurality of predetermined sound decay characteristics, including:

~~wherein providing distance-based attenuation according to sound decay characteristics comprises:~~

identifying a decay factor from one of a plurality of pre-defined decay factors and a customized decay factor for each of ~~said the~~ plurality of audio clients, ~~said the~~ plurality of pre-defined decay factors including an audio big decay factor, an audio small decay factor, an audio medium decay factor, and a constant decay factor;

determining distances between a target audio client and a plurality of source audio clients;

determining a plurality of weighted values for each of ~~said the~~ source audio clients based on said identified decay factor and ~~said the~~ distance between each of ~~said the~~ source audio client clients and ~~said the~~ target audio client, wherein each of

said the weighted values corresponds to a source/target audio client pair;
generating a mix table for each of said the source/target audio client pairs;
calculating an actual mix for said the target audio clients using said the mix table; and
refining said the actual mix for said the target audio clients, ~~wherein said refining step is used to avoid transmitting excess energy audio data, avoid the delivery of said audio data in a step-wise manner to a speaker output, avoid the performance of floating point multiplication, adapt the actual mix calculation for said target audio client to available CPU resources, select the nearest talking audio clients for the actual mix, and prepare stream audio for playing ambient background music or using an audio source forwarded from another conference.~~

18. (Currently Amended) A computer program product comprising a computer useable medium having computer program logic recorded thereon for enabling an audio conference server (ACS) to provide an application program with multi-point, weight controllable audio conferencing, said the computer program logic comprising:

managing means operable to enable ~~means for enabling~~ the computer to manage at least one audio conference, ~~said at least one audio conference comprising among~~ a plurality of audio clients;

receiving means operable to enable ~~means for enabling~~ the computer to receive audio data from said the plurality of audio clients;

~~means for enabling the computer to mix said audio data to provide spatialized audio to said plurality of audio clients in said at least one audio conferences;~~

~~wherein said mixing means includes means for enabling the computer to provide distance-based attenuation according to sound decay characteristics, at least one sound decay characteristic being assigned to each audio client from a plurality of different sound decay characteristics, each different sound decay characteristic providing a different volume/distance relationship;~~

~~wherein said sound decay characteristic may take into account decay~~

~~characteristics according to a sound's behavior, and~~

~~wherein said mixing means results in mixed audio data; and~~

~~means for enabling the computer to deliver said mixed audio data to said plurality of audio clients in said at least one audio conference.~~

mixing means operable to enable the computer to mix the audio data to yield spatialized audio data; and

delivery means operable to enable the computer to deliver the spatialized audio data to the plurality of audio clients;

wherein the mixing means includes attenuation means operable to enable the computer to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, each sound decay characteristic being associated with a respective audio client and a respective volume/distance relationship.

19. (Canceled)

20. (Currently Amended) The computer program product of claim 18, further comprising ~~means for enabling~~ checking means operable to enable the computer to check the a status of a registered owner of said the at least one audio conference to determine whether ~~said the~~ at least one audio conference still exists.

21. (Currently Amended) The computer program product of claim 20, wherein ~~said means for enabling the computer to check the status of a registered owner of said at least one audio conference~~ the checking means includes a resource audit service, ~~said the~~ resource audit service operable when ~~said the~~ at least one audio conference is generated by a first application and is being used by a second application.

22. (Currently Amended) The computer program product of claim 18, wherein ~~said the~~ plurality of audio clients includes set-top box (STB) audio clients and point source audio (PSA) ~~audio~~ clients.

23. (Currently Amended) The computer program product of claim 18, wherein ~~said means for enabling the computer to manage at least one audio conference~~ the managing means comprises means for enabling the computer to provide an audio conference server ACS shell to allow a user to interactively interface with ~~said ACS, said ACS~~ the audio conference server, the audio conference server shell including:

means for enabling the computer to provide program access to high level methods for creating and managing a proxy audio conference;

means for enabling the computer to provide program access to methods for creating and managing a plurality of point source audio (~~PSA~~) ~~audio~~ clients; and

means for enabling the computer to provide program access to low level methods for creating and managing ~~said~~ the at least one audio conference.

24. (Currently Amended) A computer program product comprising a computer usable medium having computer program logic recorded thereon for enabling an audio conference server (~~ACS~~) to provide an application program with multi-point, weight controllable audio conferencing, ~~said~~ the computer program logic comprising:

managing means operable to enable ~~means for enabling~~ the computer to manage at least one audio conference, ~~said at least one audio conference comprising~~ among a plurality of audio clients;

receiving means operable to enable ~~means for enabling~~ the computer to receive audio data from ~~said~~ the plurality of audio clients;

~~means for enabling the computer to mix said audio data to provide specialized audio to said plurality of audio clients in said at least one audio conferences,~~

~~wherein said mixing means includes means for enabling the computer to provide distance based attenuation according to sound decay characteristics,~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixing means results in mixed audio data; and~~

~~means for enabling the computer to deliver said mixed audio data to said plurality of audio clients in said at least one audio conference;~~

mixing means operable to enable the computer to mix the audio data to yield spatialized audio data; and

delivery means operable to enable the computer to deliver the spatialized audio data to the plurality of audio clients;

wherein the mixing means include attenuation means operable to enable the said means for enabling the computer to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, the attenuation means comprising comprises:

means for enabling the computer to identify a decay factor from one of a plurality of pre-defined decay factors and a customized decay factor for each of ~~said~~ the plurality of audio clients, ~~said the~~ plurality of pre-defined decay factors including an audio big decay factor, an audio small decay factor, an audio medium decay factor, and a constant decay factor;

means for enabling the computer to determine distances between a target audio client and a plurality of source audio clients;

means for enabling the computer to determine a plurality of weighted values for each of ~~said the~~ source audio clients based on ~~said the~~ identified decay factor and ~~said the~~ distance between ~~said the~~ source audio client and ~~said~~ target audio client, wherein each of ~~said the~~ weighted values corresponds to a source/target audio client pair;

means for enabling the computer to generate a mix table for each of ~~said the~~ source/target audio client pairs;

means for enabling the computer to calculate an actual mix for ~~said the~~ source audio clients; and

means for enabling the computer to refine ~~said the~~ actual mix for ~~said the~~ source audio clients.

25. (Currently Amended) The computer program product of claim 24, wherein ~~said~~ the means for enabling the computer to refine ~~said~~ the actual mix for ~~said~~ the source audio clients comprises:

means for enabling the computer to provide a gain control function to avoid transmitting excess energy audio data;

means for enabling the computer to provide a fade in/fade out function to avoid the delivery of ~~said~~ the audio data in a step-wise manner to a speaker output;

means for enabling the computer to provide a floating point operation elimination function to avoid the performance of floating point multiplication;

means for enabling the computer to provide a mixing adaption function to adapt the actual mix calculation for ~~said~~ the target audio client to available CPU resources;

means for enabling the computer to provide a mixing cut-off function to select the nearest talking audio clients for the actual mix; and

means for enabling the computer to provide a stream audio function to prepare stream audio for playing ambient background music or using an audio source forwarded from another conference.

26-44. (Canceled)

45. (Currently Amended) An audio conference server ~~providing multi-point, weight controllable audio conferencing~~ comprising:

a management ~~device managing~~ module operable to manage at least one audio conference, ~~said at least one audio conference including~~ among a plurality of audio clients;

a receiver ~~receiving~~ operable to receive audio data from ~~said~~ the plurality of audio clients;

~~a mixer mixing said audio data from said plurality of audio clients;~~

~~wherein said mixer includes a distance based attenuation device providing distance based attenuation according to sound decay characteristics, at least one sound decay characteristic being assigned to each audio client from a plurality of~~

~~different sound decay characteristics, each different sound decay characteristic providing a different volume/distance relationship;~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixer provides mixed audio data; and~~

~~an audio data delivery device delivering said mixed audio data to said plurality of audio clients in said at least one audio conference.~~

a mixer operable to mix the audio data to yield spatialized audio data; and

a delivery module operable to delivery the spatialized audio data to the plurality of audio clients;

wherein the mixer includes an attenuation module operable to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, each sound decay characteristic being associated with a respective audio client and a respective volume/distance relationship.

46. (Currently Amended) An audio conference server ~~providing multi-point, weight controllable audio conferencing~~ comprising:

a management device ~~managing~~ module operable to manage at least one audio conference, ~~said at least one audio conference including among~~ a plurality of audio clients;

a receiver ~~receiving~~ operable to receive audio data from ~~said~~ the plurality of audio clients;

~~a mixer mixing said audio data from said plurality of audio clients;~~

~~wherein said mixer includes a distance based attenuation device providing distance based attenuation according to sound decay characteristics;~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixer provides mixed audio data;~~

a mixer operable to mix the audio data to yield spatialized audio data; and

a delivery module operable to deliver the spatialized audio data to the plurality of clients;

wherein the mixer includes an attenuation module operable to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, the attenuation module including:

~~wherein said distance-based attenuation device includes:~~

an identification ~~device~~ identifying module operable to identify a decay factor from one of a plurality of pre-defined decay factors and a customized decay factor for each of ~~said the~~ plurality of audio clients, ~~said the~~ plurality of pre-defined decay factors ~~including:~~ including an audio big decay factor, an audio small decay factor, an audio medium decay factor, and a constant decay ~~factor,~~ factor;

a distance determining ~~device~~ determining module operable to determine a distance between a target audio client and a plurality of source audio ~~clients,~~ clients;

a weighted value determining ~~device~~ determining module operable to determine a plurality of weighted values for each of ~~said the~~ source audio clients based on ~~said the~~ identified decay factor and ~~said the~~ distance between each of ~~said the~~ source audio clients and ~~said the~~ target audio client, wherein each of ~~said the~~ weighted values corresponds to a source/target audio client ~~pair,~~ pair;

a mix table generator generating operable to generate a mix table for each of ~~said the~~ source/target audio client pairs,

a calculator ~~calculating~~ operable to calculate an actual mix for ~~said the~~ target audio clients, and

a refining ~~device~~ refining module operable to refine the actual mix for ~~said the~~ target audio clients; ~~and~~

~~an audio data delivery device delivering said mix audio data to said plurality of audio clients in said at least one audio conference.~~

47. (Currently Amended) A computer executable code for an audio conference server providing multi-point, weight controllable audio conferencing, ~~said the~~ code comprising:

a managing section ~~enabling~~ operable to enable management of at least one audio conference, ~~with said at least one audio conference including~~ among a plurality of audio clients;

a receiving section ~~enabling~~ operable to enable reception of audio data from ~~said~~ the plurality of audio clients;

~~a mixing section enabling the audio conference server to provide spatialized audio to said plurality of audio clients in said at least one audio conference,~~

~~wherein said mixing section includes a distance based attenuation section providing distance based attenuation according to sound decay characteristics, at least one sound decay characteristic being assigned to each audio client from a plurality of different sound decay characteristics, each different sound decay characteristic providing a different volume/distance relationship,~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior, and~~

~~wherein said mixing section results in mixed audio data; and~~

~~a delivery section enabling delivery of said mixed audio data to said plurality of audio clients in said at least one audio conference.~~

a mixing section operable to enable mixing of the audio data to yield spatialized audio data; and

a delivery section operable to enable delivery of the spatialized audio data to the plurality of audio clients;

wherein the mixing section includes an attenuation section operable to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, each sound decay characteristic being associated with a respective audio client and a respective volume/distance relationship.

48. (Currently Amended) A computer executable code for an audio conference server providing multi-point, weight controllable audio conferencing, ~~said~~ the code comprising:

a managing section ~~enabling~~ operable to enable management of at least one audio conference, ~~said at least one audio conference comprising~~ among a plurality of audio clients;

a receiving section ~~enabling~~ operable to enable reception of audio data from ~~said~~ the plurality of audio clients;

~~a mixing section enabling mixing of said audio data to provide spatialized audio to said plurality of audio clients in said at least one audio conference;~~

~~wherein said mixing section includes a distance based attenuation section enabling distance based attenuation according to sound decay characteristics;~~

~~wherein said sound decay characteristic may take into account decay characteristics according to a sound's behavior;~~

~~wherein said mixing section results in mixed audio data;~~

~~wherein said distance based attenuation section includes:~~

a mixing section operable to enable mixing of the audio data to yield spatialized audio data; and

a delivery section operable to enable delivery of the spatialized audio data to the plurality of audio clients;

wherein the mixing section includes an attenuation section operable to provide distance-based attenuation according to a plurality of predetermined sound decay characteristics, the attenuation section including:

an identification section enabling operable to enable identification of a decay factor from one of a plurality of pre-defined decay factors and a customized decay factor for each of ~~said~~ the plurality of audio clients, ~~with said~~ the plurality of pre-defined decay factors ~~including:~~ including an audio big decay factor, an audio small decay factor, an audio medium decay factor, and a constant decay factor;

a distance determining section enabling operable to enable determination of distances between a target audio client and a plurality of source audio ~~clients;~~ clients;

a weighted value section enabling operable to enable determination of a plurality of weighted values for each of ~~said~~ the source audio clients based on ~~said~~ the identified decay factor and ~~said~~ the distance between ~~said~~ the source audio client

and ~~said~~ the target audio client, ~~where~~ wherein each of ~~said~~ the weighted values corresponds to a source/target audio client ~~pair~~, pair;

a mix table section ~~enabling~~ operable to enable generation of a mix table for each of ~~said~~ the source/target audio client ~~pairs~~, pairs;

a calculation section ~~enabling~~ operable to enable refinement of ~~said~~ the actual mix for ~~said~~ the target audio ~~clients~~, clients; and

a refining section ~~enabling~~ operable to enable refinement of ~~said~~ the actual mix for ~~said~~ the target audio clients; ~~and~~

~~a delivery section enabling delivery of said mixed audio data to said plurality of audio clients in said at least one audio conference.~~